Compact 2 Micron Seed Laser, Phase I

Completed Technology Project (2005 - 2005)

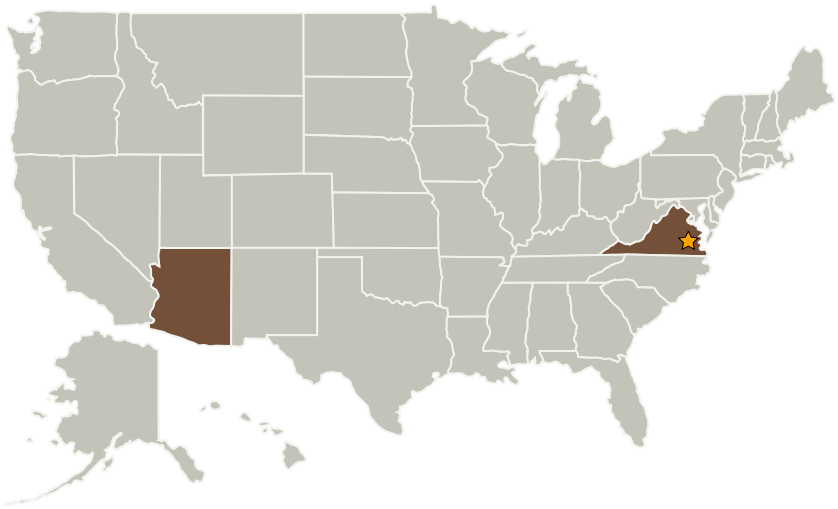
Project Introduction

This proposal is for the development of new compact, high power and extremely reliable 2 micron seed laser using newly developed Tm3+ doped germanate glass fibers, which exhibit high quantum efficiency. This type of fiber based seed laser is needed for constructing high energy pulsed 2 micron Ho-doped crystal lasers for LIDAR applications. We propose to use highly Tm3+ doped germanate glass fibers with high gain per unit length to form a short linear cavity to generate single frequency fiber laser operation. Germanate glass exhibits lower phonon energy compared to silica glass, increasing the quantum efficiency of 3F4 level of Tm3+ ions. Importantly, Tm3+ can be highly doped into germanate glasses, which results in so called cross-relaxation, dramatically improving the gain per unit length and the quantum efficiency. The single frequency fiber laser will be used to construct seed lasers by integrating with controlling electronics.

Anticipated Benefits

This single frequency 2 micron fiber laser and seed laser can be used for many commercial applications, especially for fiber optic sensor where a long coherence light source is needed.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
NP Photonics, Inc.	Supporting Organization	Industry	Tucson, Arizona

Primary U.S. Work Locations	
Arizona	Virginia

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Project Manager:
Jirong Yu

Principal Investigator:
Shibin S Jiang

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers